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ABSTRACT

This report describes a program for implementing specific cooperative grouping patterns in order to increase students' academic performance. The targeted population consisted of junior high and high school students located in the northwest and southwest suburbs of a large metropolitan area. An instructional strategy in which both like-gender and mixed-gender grouping patterns were used in Spanish and math classroom cooperative activities is outlined. Findings indicate that single-gender groups achieved higher scores, received more favorable evaluations, and generally had more positive group interactions. (Contains 18 references.) (WRM)

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INCREASING STUDENT ACADEMIC ACHIEVEMENT THROUGH THE USE OF SINGLE AND MIXED GENDER COOPERATIVE GROUPING PATTERNS

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An Action Research Project Submitted to the Graduate Faculty of the School of Education in Partial Fulfillment of the Requirements for the Degree of Master of Arts in Teaching and Leadership

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ABSTRACT

This report describes a program for implementing specific cooperative grouping patterns in order to increase students' academic performance. The targeted population consisted of junior high and high school students located in the northwest and southwest suburbs of a large metropolitan area. The problem of utilizing only mixed-gender cooperative grouping patterns in the classroom was documented through data revealing the large numbers of students' inconsistent academic performance.

Analysis of probable cause data revealed that students report a lack of social skills related to self-esteem, listening actively, and communicating assertively. Additionally, the data indicated a lack of skills related to accomplishing academic tasks such as paraphrasing, modeling, and reviewing.

A review of solution strategies suggested by knowledgeable others, combined with an analysis of the problem setting, resulted in the selection of implementing both cooperative grouping patterns, (like-gender, mixed-gender), in math and Spanish classroom cooperative activities; and the utilization of checklists and student and or teacher self-evaluations to assess student productivity.

Post intervention data indicated that single gender groups achieved higher scores, received more favorable evaluations, and were noted for more positive group interactions.

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CHAPTER 1

PROBLEM STATEMENT AND CONTEXT

General Statement of the Problem

The seventh through tenth grade targeted students exhibit inconsistent academic performance when working in cooperative groups. The existence of the problem is evident in teacher and student assessments, teacher observations, and class generated discussions. Therefore, this study will show the effects of like-gender grouping versus random grouping on students academic performance in the targeted math and Spanish classes. This study will take place in two sites.

Site A

Immediate Problem Context

The Community Consolidated School District of Site A is a very large elementary district which includes 28 schools serving seven different cities in Chicago's northwest suburbs. Site A serves approximately 650 students in seventh and eighth grade. This is the location of the two targeted math classes. The majority of total enrollment (69.6%) is white, (5.9%) black, (9.5%) Hispanic, (14.7%) Asian/P. Islander, and (.3%) Native American. Five and three tenths percent of the population is limited-english-proficient and 1.9% is low-income. The school has an attendance rate of 96% and student mobility rate of 7.1%. Only 69.6% of the parents/guardians of the students made at least one contact with their child's teachers during the 1995-

1996 school year in comparison to other figures of 98.7% in the district and 95.4% in the state.

Site A's instructional setting is like a mini high school. Each day consists of nine 40 minute periods. The subjects offered are the core subjects as well as electives such as foreign language, fine arts, and life skills.

The buildings in the district are relatively new. Site A is a one level all brick building that was formerly used as an elementary school. Throughout the years, as the student population declined, Site A was closed. It was renovated and reopened as a junior high in 1994 to accommodate an increase in student population.

The average class size in Site A is 21 students. The pupil-teacher ratio is 19.1: 1. The district 's operating expenditure per pupil is $ 7,055. The district includes 85.7% female teachers and 14.3% male. Of these percentages, 97.3% are white. The average teaching experience is 16.7 years with 56.4% having a master's degree or above. The district 's reading scores were not in line with their other scores. Therefore, many schools have made changes to remedy this. Site A has implemented a school-wide reading period every Wednesday for 20 minutes.

The Surrounding Community

In 1990, the majority of the community in Site A was of upper/middle level income with 46% of the population earning $50,000 or more, 15% earning $40,000-$49,000, and 27% receiving $20,000-$39,999. Single family homes range from $90,000-$600,000 with the average selling price for a detached single family home at $175,000. The population by racial/ethnic background is 90.6% white, 6.4% Asian, 2.2% black, and 0.8% other. There are 24 churches within the city and 84 churches located within a five mile radius of the community.

The local school district is well-liked by the surrounding community. The district's superintendent started her second year in 1996-1997. She joined the district

from California and has been accepted into the community with open arms. Currently, the junior highs are on her mind as well as the school board's mind. A proposal will soon be voted on to incorporate a middle school philosophy into the junior high system. However, Site A reopened three years ago already implementing most of the proposal. For example, all students have been placed on teams, support staff placed in some rooms, and teachers have been given common planning periods. It has been difficult for Site A to do because under district guidelines, the school must be a "junior high". Another implementation to the site has been the addition of a school resource officer from the local city police department.

Site B

Immediate Problem Context

The Community Consolidated District of Site B is a unit district which consists of grades prekindergarten through 12 serving students in a southwest suburb of Chicago. Site B includes approximately 2,000 students, grades 9 - 12. The following racial/ethnic background is represented in the school: 95.4% white, 0.2% black, 3.4% Hispanic, 0.9% Asian, and 0.0% Native American. The district's low income students are defined as families receiving public aid, students living in institutions or in foster homes, and eligible to receive free/reduced price lunches. The percentage of this type of student in Site B is 1.5%. Students eligible for bilingual education is 0.3%. The drop out rate for the high school is 2.7%. The rate of students who attend school regularly is 95.4%. The student mobility rate is 0.4%. The parents/guardians of 100% of the students made at least one contact with the student's teachers during the school year.

The instructional setting of Site B is a high school including grades 9 - 12. There are nine periods in a day, consisting of 52 minutes per class period. The subjects offered are the core subjects as well as electives such as foreign language,

fine arts, and life skills. The district of Site B includes eight schools, all of which are either relatively new or have recent additions. Site B is a two story brick building which was rebuilt in 1990 due to the destruction of a tornado. Needless to say, the building is very modern in decor, equipped with a television set and telephone, dry erase marker boards, and plenty of storage space within each classroom.

The average class size is 26. The pupil-teacher ratio is 20.4:1. The operating expenditure per pupil in the district is $4,474. The district includes 77% female teachers and 23% male teachers. Of these percentages, 99.1% of teachers are white. The average teaching experience is 11.6 years with 37.2% having a master's degree or above.

The Surrounding Community

In 1993, the majority of the community in Site B was of middle class income with the average family earning $70,000 or more. The average single family home is sold for $135,000. The racial/ethnic background includes 95% white, 3.4% Hispanic, 0.2% black, and 0.9% other. There are nine churches in the immediate community. The average age of the population is 34.1.

The community is extremely supportive of the school district as far as athletics and extracurricular activities go. The academic reputation of the district is favorable as well. Recently, there have been many changes occurring within the community, as well as the district. This previously predominant rural town has been experiencing a rapid growth rate over the last four years. Present schools are filled to capacity. The school board is currently working with supportive members of the community to pass a referendum for two new elementary schools, one new middle school, and a new high school. The community's feeling about the referendum is divided due to the subsequent tax increases, a growing population, and commercialization of the city.

The administration has been developing creative plans to provide room for the

over abundance of students. Site B implemented an overlap schedule in the 1997-98 school year. An upper classman's school day begins at 7:30 a.m. and ends at 1:50 p.m. An under classman's school day begins at 9:30 a.m. and ends at 3:50 p.m. This inevitable type of scheduling creates many conflicts for co-curricular activities, as well as for teacher/class scheduling that includes grades 9 - 12.

In the 1995/96 school year, the high school has implemented an interdisciplinary program with a core group of freshman. This group has the same four teachers: math, science, English and physical education/health. The teachers teach in a team. This program is a form of a school within a school. It proved very successful during its first year, so it will continue with a new group of freshmen for the second year.

National Context of the Problem

> "Becky Wheeler's second-grade students are sorting and identifying the leaves they have collected. They work in groups of five, with one girl in each group assigned to record the findings. When they finish, Wheeler asks the boys to put the chairs back, and the girls to wipe off the table.
>
> Then she reads the class a story about Martha Washington. When Nathan calls out a question, she answers it. When Audrey calls out, Wheeler says " Now boys and girls, remember to raise your hands."
>
> Walking to the cafeteria, the girls form one line and the boys form another. When the boys talk smart and poke each other, Wheeler says, " the girls are behaving. Why can't you?" (Ambrose, 1996, p. 73).

If Becky Wheeler had been working anywhere else but in the classroom, she would most likely be accused of sexual discrimination or gender bias. The actions that she has taken have inadvertently demonstrated unequal treatment of her students.

For example, she responded to a boy who shouted out an answer, but reprimanded the class when a girl took the same action. In this scenario, one may perceive Becky as allowing boys to be more vocal and dominant in her classroom. Because of practices like these within classrooms, some teachers are giving direct and or indirect messages to kids about what behavior is okay for boys and girls.

Many disciplines in education are now perceived to be either a male domain or a female domain. For example, both math and science are perceived to be male domains in which males are expected to be better than females. Such perceptions become particularly strong in middle-late adolescence (Fennema & Sherman, 1977-1978).

Across the nation, efforts have been made to develop techniques to help teachers create a bias-free classroom. However, one of the biggest challenges within this effort, was teaching teachers how to detect and correct biases within their classroom (Scholtz, 1993, as cited in Ambrose). Programs such as the American Association of University Women Education Foundation (AAUW) and the National Coalition for Sex Equity in Education have held workshops to educate and inform professionals of this growing problem (Ambrose, 1996). Unfortunately, the Federal Government canceled funding for state-based gender-equity programs in June, 199€ (Ambrose, 1996).

Numerous studies have examined aspects of gender and cooperative learning. According to Webb (1984), females are generally ignored when they ask for help in majority-male groups. "In majority-female groups, females ignore each others' request for help because they focus so much attention on the males in the group" (Dillow,1994, p. 49). Evans (1993) , found that all female cooperative groups tended to be more emotional and mixed-gender groups were more action and plot oriented. Across studies, it seems that girls interact more and achieve more when they participate in

like-gender groups in various settings in middle school through college (Dillow, 1994). However, many researchers noted that although success rate varies depending on the way in which students are grouped, all students benefit from any cooperative learning experience (Bellanca & Fogarty, 1991).

All in all, research indicates that cooperative learning can be beneficial in the classroom. Efforts have been made by researchers and teachers to determine which specific set-ups work best for students. Programs have been implemented to educate teachers. Research findings vary, but most find cooperative grouping in like-gender to be helpful for females. The next section will show evidence of the problem within our math and Spanish classrooms.

CHAPTER 2

PROBLEM DOCUMENTATION

Problem Evidence

In order to document the extent of student academic achievement in like gender cooperative groups and random mixed gender cooperative groups, student assessment sheets, teacher observation checklists, and graded artifacts from the group activities were used.

Two junior-high math classes consisting of a total of 51 students and two high school Spanish three classes consisting of a total of 54 students were involved in this process over the three month time period. A student assessment form was developed by the researchers (Appendix A) to aid in the evaluation process. A summary of the students' responses to each category is presented in Table 1.

The student assessment sheet presented in Appendix A was used as an evaluation tool for the students after they completed each cooperative activity. The evaluation sheet was divided into four main areas of assessment: productivity, participation, comfort level and social skills. The students ranked their group in each area from one to five. A detailed explanation of each ranking can be found on Appendix A. While students worked on their cooperative groups, the teachers from Site A and Site B observed student behavior.

Although the teachers of Site A and B teach different grade levels and subject

areas, many of the observational findings were the same. When girls were grouped in single gender groups they seemed to be more comfortable and communicative. They really worked together to complete the task. Even though they occasionally got off task, they managed to finish their work collaboratively. When students worked in mixed groups, they did not communicate with each other as much as they did when grouped by single gender. When they did communicate, it seemed more formal and orderly. It appeared that they were not as concerned with finishing the task because it would require them to communicate more with each other. Students expressed both verbally and physically that they would be more comfortable working independently.

Table 1

Mean of the Modes of Students' Responses (Weeks One Through Four)

	Math		Spanish	
Areas of Assessment	Single	Mixed	Single	Mixed
Productivity	4.00	4.00	5.00	5.00
Participation	4.50	4.00	5.00	4.25
Comfort Level	4.50	4.25	5.00	5.00
Social Skills	3.75	3.50	4.25	4.25

According to Table 1, in weeks one through four, both the single and the mixed responses of the math classes assessing their individual work were relatively close. Both groups felt that their groups' productivity was good. They accomplished their task and felt they deserved an A-. The single and mixed groups, on the average, noticed that everyone in their group helped. However, the single groups' response was .50

higher than the mixed groups. In general, the students of both groups were comfortable in their groups and were able to express their ideas openly. The single gender groups showed .25 of an increase when compared to mixed gender. Finally, both single and mixed did not hear any put downs in their groups. They also heard some encouraging words once in a while. The single groups acknowledged each other positively .25 more than the mixed groups.

Regarding the Spanish class student evaluations, during weeks one through four, both single and mixed gender groups' responses were fairly similar. Both groups felt that, as far as productivity was concerned, their group deserved an A. They felt they had met the guidelines and accomplished their task. Under participation, the single gender groups were confident that everyone helped to complete the given task. However, the mixed gender groups reported .75 lower in the participation of all group members. At times, they reported at least one member did not participate. The comfort level of both gender groups showed positive results. They felt they could openly express their ideas. Finally, regarding social skills, both groups noted occasionally hearing encouraging remarks. For the most part, not put downs or positive comments were given.

When comparing the tables of the math and Spanish classes, the single gender groups display slightly higher responses. However, in some cases the means were the same. Single gender responses were never lower than mixed gender responses.

The following figures, Figure 1 and Figure 2, display line graphs of the mean score of the students' activities weeks one through four in the math and Spanish classes. The graphs present a comparison of the extent of student academic achievement in both subject areas when students are in mixed gender as well as single gender groups.

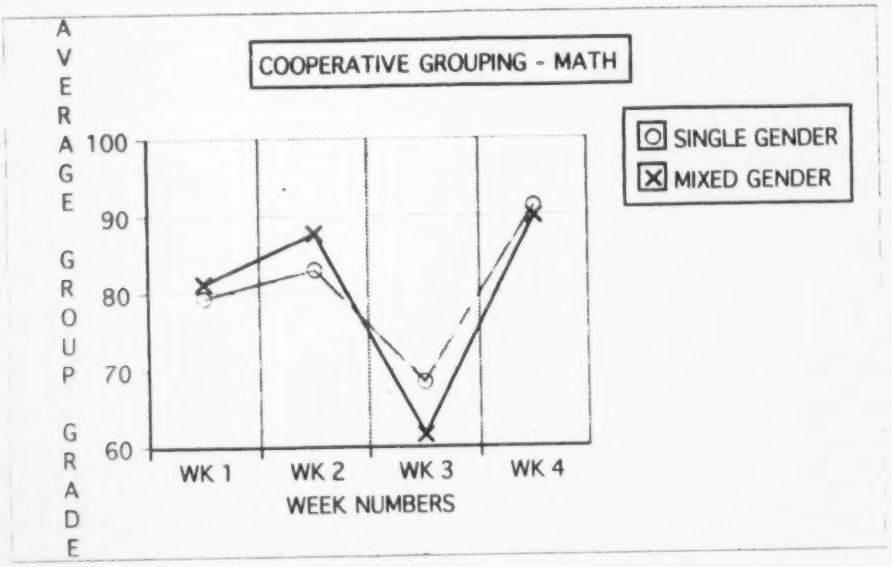

Figure 1. The figure above represents grades from students at Site A. The scores were derived from cooperative activities during the initial four weeks of research. The graph shows that there is no significant difference in academic performance between single and mixed gender grouping in the math classes at this time. During weeks one and two, mixed gender groups achieved a higher average group grade than single gender groups. In week three, single gender earned approximately 8% higher on their average group grade than mixed gender. Week four shows that single gender was higher than mixed gender by approximately 1%.

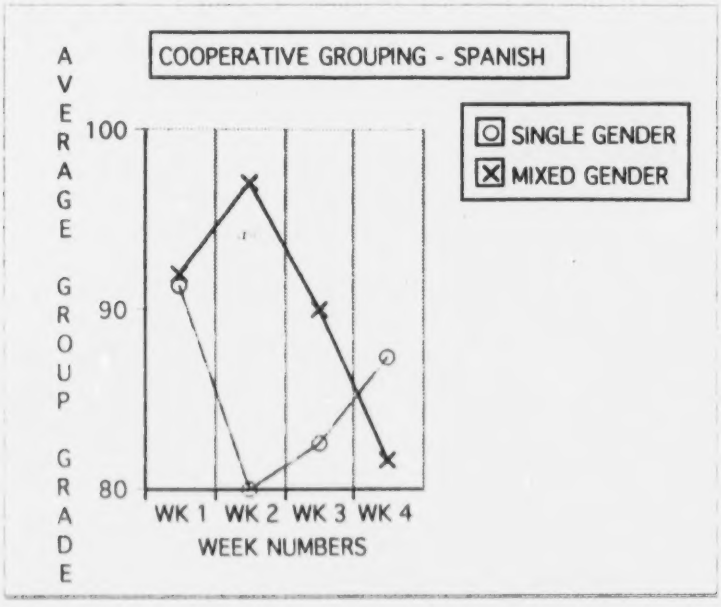

Figure 2. Figure two represents average group grades for Site B during the initial four weeks of research. With the exception of week four, mixed gender groups achieved higher average group scores than single gender groups. In week one, mixed gender earned approximately 1% higher average grades than single gender. During week two, mixed gender earned approximately 17% higher average grades than single gender. In week three, mixed gender achieved approximately 8% higher average grades than single gender. Finally, during week four, mixed gender earned approximately 6% lower average grades than single gender groups.

When comparing the graphs of the math and Spanish classes, the mixed gender groups achieved higher scores than the single gender groups in five out of eight given activities. Three of these activities were in the Spanish classes. Two of the

activities were from the math classes. However, the group scores of both single and mixed gender groups did not have significant variances. For example, in the math activity for week one, the mixed gender average grade was only approximately 1.75% higher than the single gender average grade. There are a number of causes that are related to this problem.

Probable Causes

The literature as well as observational studies from Site A and Site B, suggest several underlying causes for inconsistent academic performance when working in cooperative groups. Causes to be discussed include gender, confidence level, and gender bias.

Gender

Many studies have isolated gender as a factor affecting achievement. When Noddings (1989, as cited in Workman) examined gender differences, females preferred and performed better in single gender cooperative groups. "Increasing the number of females and decreasing the number of males in the group results in a greater focus on the male. Females directed more of their questions to the males when they outnumbered males" (Webb, 1984, p. 40). According to Perry (1996), when students are grouped by like gender, there are fewer discipline problems and girls feel freer to participate and express their opinions. "Boys and girls when taught together are often more concerned with how they look and appear to each other than they are in what is being taught" (Perry, 1996, p. 35). A solution to this tendency is to group students by like-gender. Female interaction increases when working in like- gender groups, furthermore increasing their level of confidence (Dillow, Flack, & Peterman, 1994).

Confidence Level

Cooperative learning provides students with an opportunity to work together to

accomplish a given task. It provides students with the time and space to share and speak freely with each other. If the student's confidence level is low, it can affect their achievement in the group work. Female adolescents may repress indications of their own knowledge or brightness for fear of rejection, while the level of self-image and achievement of boys typically remains stable or increases (Manning, 1993). According to Nowicki, Duke and Croutch (1978), females who see themselves as influencing outcomes perform at significantly higher levels.

Working individually may be detrimental to student confidence because it limits their experience in sharing ideas with others and may encourage students to give up on a task earlier than when working with a team. As a team, students can encourage each other in their efforts to produce a solution for their task. By experiencing successful group encounters, students are given the confidence to accept the challenge of future higher level tasks.

Gender Bias

Level of confidence is also a good predictor of whether students will continue in higher level courses. "Data shows that two to three times as many males as females take physics, chemistry, and advanced mathematics. Males comprise more than 90 percent of the work force in such related professions" (Karp & Shakeshaft, 1997, p. 87).

Another reason for such statistical evidence is the existence of gender bias in the classroom. This bias is "shortchanging" girls (Karp & Shakeshaft, 1997). Teachers seem to call on boys more often, especially to answer more complex questions that involve abstract reasoning (Ambrose, 1996). Females seem to be called on to answer basic recall questions and are rewarded for being quiet and conforming (Ambrose, 1996). As schools, classrooms, and teachers become more conscious of gender equity, all children will have opportunity to grow into productive students according to

their abilities, not according to their gender (Ambrose, 1996).

In conclusion, the causes that affect achievement in cooperative groups are all inter linked in some way. Gender, confidence level, and gender bias all play a role in how they develop and how they work cooperatively.

CHAPTER 3

THE SOLUTION STRATEGY

Literature Review

This study relates to one aspect of cooperative learning. The purpose was to investigate single and mixed gender cooperative grouping patterns in junior high mathematics classes and high school Spanish classes and their effects on student academic achievement.

Cooperative learning is an instructional strategy. Students are placed into groups of two to five students of different ability, skill, motivation, sex, or racial origin who work to achieve a single learning goal. The teacher uses a variety of structures and strategies to help build success within each group. For example, higher-order thinking is implemented into every lesson, social skills are taught, students share roles, groups evaluate their own progress, teachers evaluate groups and students rely on each other. As the work of many researchers shows, cooperative groups increase students' mastery of skills (Bellanca & Fogarty, 1991).

The following discusses some literature findings that support cooperative learning and gender grouping patterns. Two of the factors that affect student academic achievement are the stereotype of gender dominated areas in education and students' locus of control.

Cooperative Learning

A review of current literature indicates that teachers can improve student academic achievement through periodically implementing cooperative grouping into their curriculum. "The majority of research shows that small cooperative group work is better than whole class or individualized instruction at improving student academic achievement" (McCabe & Rhoades, 1988, p. 13, as cited in Workman). In a study by Dewar (1963, as cited in Workman), eight sixth grade classrooms were examined to see whether children benefited more from within class homogeneous grouping instruction or from the traditional whole class instruction. Each class was divided into three homogeneous groups. All the students used the same textbook materials and were given the same amount of instruction time. Alternate forms of the Standford Achievement Test were given for the pre and post tests. Statistically significant results revealed that homogeneous grouping for mathematics instruction benefited the high-achieving and low- achieving groups. There is a strong positive correlation between the ability to think critically, and to think more creatively when learning occurred in group settings (Slavin, 1991). Research has provided evidence that shows that working in groups is beneficial for students. Next, is a look at the way in which students should be grouped and why.

Single and Mixed Gender Grouping

According to Workman (1990), researchers have found that females prefer and perform significantly better in single gender cooperative groups. In addition, Noddings (1989, as cited in Workman) found that single gender settings had positive effects on participation of females in academic settings. Concurring, Lee and Lockheed's comparative international review (1990) indicated that students in single-sex schools have achieved more academically than students in coed schools. Schmuck and

Egmond, (1965, as cited in Workman) conducted a study of 18 elementary, four junior high, and 5 high school classes (727 students total). The data was collected and measured using rater/scorers. This study found that four non-academic variables influenced math performance of girls while only two did for boys. Perceived parental attitude toward school, social class, peer liking, and satisfaction with the teacher were all positively related to girls performance in the classroom. The two variables associated with boys were perceived group status and satisfaction with the teacher.

Literature also suggests that female students perform differently depending on the gender mix of the group. Research by Webb (1984) and Dalton (1990) showed that group size and composition illustrate this tendency. Webb (1984) found no difference in achievement and interaction patterns in groups with equal numbers of females and males.

Two junior high math classes taught by the same teacher participated in a study for two weeks. At the end of the study, a 20 item achievement test was given to the students. All groups had similar means as far as ability was concerned. Even though males and females had comparable ability, males outperformed females on the achievement test. Webb (1984) explained this result due to a greater success of males in obtaining explanations and information when they requested them. The females in the majority-male groups were often ignored even when they asked for help. Both females and males tended to seek help from males more often than from females. Webb (1984) assessed this by tape recording interaction between group members. Females were less communicative and involved for fear of jeopardizing their relationships and overstating authoritative group members, "women in communal groups seem to have more authority and control over their own learning process" (Sommers, 1992, p. 12).

Mixed gender grouping had the overall lowest post test mean and was least

favored by the students. The majority of the students felt they learned and accomplished more in single gender groups (Johnson, 1985). The few studies that investigated the effects of single gender and mixed gender grouping on student academic achievement indicated that females perform better in single gender groups (Noddings, 1989, as cited in Workman). One of the factors that affects such a finding is the stereotype of male dominated subject areas.

Gender Dominated Areas

Throughout education, many areas are stereotyped as a male dominant field. The teaching methods and learning experiences of such courses have traditionally concerned males students (Dillow, Flack, & Peterman, 1984). Because of this, enrollment of females in these classes is lower than that of the male enrollment (Karp & Shakeshaft, 1997). "There is evidence that math is perceived as a male domain in which males are expected to be better than females. This perception becomes particularly strong in middle through late adolescence" (Webb, 1984, p. 34). According to Fennema and Sherman (1978), females tended to perceive males in the group as the dominators even though the females ascribed superior abilities. Girls typically asked boys, "Why don't you say the answer? You always know what to do." Even though the male student had made errors during his group work, the females continued to view him as the leader. In 1990, Moody and Gifford studied eight high school chemistry classes' laboratory activities after hypothesizing that students' laboratory achievement will be higher in small groups than it will be in large groups and that single-gender groups achieve more than mixed gender groups. After a one year study, they concluded that students in high school chemistry classes achieved more in homogeneous groups according to reasoning ability and gender regardless of the academic content.

Fennema and Sherman's study (1978), shows that the problem of girls losing

their confidence and right to speak their minds needs to be addressed as a factor that affects student academic achievement. The results of this study demonstrate that females students should value their own voice and share their knowledge. A second factor that affects student achievement is locus of control.

Locus of Control

Nowicki, Duke and Crouch (1978) developed a study to see if paring females with other females would increase achievement among women. The subjects were 80 male and 80 female college students with a median age of 19. They were asked to complete a personality trait survey and return two weeks later to complete another task where they were randomly placed into competitive/cooperative and or single-gender/ mixed-gender groups. Their findings suggest that when grouped cooperatively, females should be with at least one other female because their gender role may be more complex than that of males. The females' achievement performance may not truly reflect ability depending on the achievement situation.

Dalton (1990) also investigated the effects of locus of control and gender arrangements. The interaction of fifth and sixth graders was studied during an interactive video lesson. It was apparent that males were more likely to display an urge to compete and females were more task oriented. Females tried to assist their groups by offering suggestions for improvement. Males tended to criticize. Researchers suggest training in cooperative skills as a solution (Webb, 1984). Male students might be trained to be more responsive to other students' requests for help, while female students might be trained to persevere until their questions are answered (Cohen, 1973).

The review of literature indicates that gender differences in cooperative groups affect students' academic achievement. "These studies show that there may be significant advantages for all female cooperative groups in various settings from

middle school through college" (Dillow, Flack, & Peterman, 1994, p. 50). Females have more positive or beneficial interaction with other females than they do when working with males or within mixed gender groups. To ensure an increase in the achievement of females, teachers need to address the idea of confidence and expression of thoughts as mentioned in the paragraph above. Across studies, it seems to show that girls interact and achieve more when participating in like-gender groups. The findings of Fennema and Sherman's study (1978) support the societal view of gender-bias in male dominated subject areas. We can hypothesize from this that female performance level will remain the same until such stereotypes are addressed within the classroom.

Project Objective and Processes

As a result of like-gender grouping, during the period of September, 1997 through January, 1998, the seventh through twelfth grade students from the targeted classes will increase their mathematical and Spanish language arts skills, as measured by teacher checklists, student and teacher evaluations, teacher constructed activities and assignments, and analyses of students' grades.

In order to accomplish the terminal objective, the following processes are necessary:

1. Curricular materials that foster cooperative learning will be developed
2. Like-gender grouping will be incorporated in two out of the four targeted classes.
3. Within the lesson plans, time will be scheduled to include cooperative learning activities.
4. Student artifacts from lessons will be collected and analyzed.
5. Self-evaluations and teacher observation checklists will be developed to assess comfort level and academic progress.
6. Graphing techniques will be implemented to analyze overall student

academic achievement.

Project Action Plan

I. Cooperative Learning

1. Cooperative activities will be performed once a week. The activity will be dependent on curricular time lines. Each week, two of the four targeted classes will be grouped by like-gender, and two grouped by mixed gender. These grouping patterns will be used to analyze variances in student academic achievement.

2. A cooperative lesson will be implemented into the targeted classes once a week throughout the months of September through December, 1997.

3. Cooperative learning activities will be conducted depending on the length of the curricular unit.

4. Beth Perrone will be teaching the two math classes. Pia Klebosits will be teaching the two Spanish classes.

5. Two seventh grade advanced math classes and two level III Spanish classes will be participating in this project.

II. Assessment

1. Assessment will be used to determine the groups' productivity.

2. Assessment will occur once a week beginning September 12, 1997 and continuing through December 19, 1997.

3. Teacher and student evaluation forms such as checklists and journal stems focusing on group and individual productivity will be used.

4. Teachers and students from the targeted classes will complete these forms of assessment.

III. Analysis

1. Assessment forms and student artifacts will be analyzed after each activity.

In December, data will be compiled and a final analysis will be produced in January, 1998.

2. Multiple line graphs and means will be used to analyze student artifacts such as worksheets that are collected throughout the project.

3. The activities and data collected will be analyzed by the teachers, Beth Perrone and Pia Klebosits.

4. Analyses will be conducted to draw conclusions and numerically support the data collected.

Methods of Assessment

In order to assess the effects of the cooperative grouping techniques, the grades of the students' assignments will be recorded and the mean of the students compiled scores from each subject area will be calculated. Graphs will then be created to display overall student academic achievement. In addition, students will individually complete a self and or group assessment form at the conclusion of each activity. Throughout each activity, the teachers will record student and group productivity on an observation checklist and or journal.

CHAPTER 4

PROJECT RESULTS

Historical Description of the Intervention

The objective of this project was to increase students' mathematical and Spanish language arts skills through single gender cooperative grouping. The implementation of the cooperative grouping patterns, single gender groups and mixed gender groups, were selected to effect the desired academic improvement.

Cooperative learning was used as a teaching strategy in the math and Spanish classes to facilitate communication with peers, student motivation, and development of thinking skills, while they worked together to achieve common academic goals. The classroom activities were created according to current curriculum being taught and were performed once a week for a 15 week period. The participating classes were placed by the teachers, randomly, into single gender and mixed gender groups, consisting of three to four students. For example, during week one, of the two math classes, period four was arranged in single gender groups. Period seven was placed in mixed gender groups also consisting of three to four students. However, in week three, period four was placed in mixed gender groups while period seven was in single gender groups. Student roles varied according to the given activity. Roles such as reader, recorder, materials person, and observer were randomly assigned .

Basic cooperative skills were reviewed with the students before the beginning

of the study. The teachers facilitated a lesson, with each class, in creating a t-chart to discuss what cooperative grouping looks like and sounds like. Effective components such as social skills and assumed roles were also modeled for the students.

Throughout the data collection, various deviations from the original action plan occurred. Due to curricular guidelines and time management, students participated in two cooperative activities in one week rather than only one activity in one week. At the conclusion of the second activity, it was determined by the teachers that the student assessment form needed written statements for the numbers in each category. Initially, the teachers read the descriptions verbally to the students. The checklist format that the teachers originally planned to use during observations became a free write journal so that students' responses could be quoted and observations could be more detailed.

Various methods of assessment were used to determine the student groups' productivity. Student assessment forms were completed after each activity to allow students to individually rank their group's productivity, participation, use of social skills, and individual comfort level. Students were also given a space to provide additional comments if necessary. The teachers then averaged the modes of the students' responses to each category for the 15 activities. Teacher observation journals were produced during each activity to record interesting findings amongst the groups. Finally, student artifacts from group work were graded, recorded, and then placed into a line graph to examine the level of increase and or decrease in academic achievement.

Presentation and Analysis of Results

Table 1, as presented in Chapter 2, displayed the mean of the most frequent scores of students' responses to each category on the student assessment form for weeks one through four. According to this, both the single and the mixed responses of

the math and Spanish classes, assessing their individual work, were relatively close. The single gender groups displayed slightly higher responses than the mixed gender. In some cases, the means were the same. Single gender responses were never lower than mixed gender.

Table 2 displays the modes of students' responses to each category on the student assessment form for all 15 activities. The mode was used because students individually chose a number related to a given category (productivity, participation, comfort level, social skills) best describing their group during each activity. The mode allowed the researchers to categorize the overall response of the whole class for each activity. The areas of assessment for each activity were then averaged, using the scores given within each category (ie. participation -5 : everyone helped).

Table 2

Mean of the Most Frequent Scores of Students' Responses (Activities 1 through 15)

	Math		Spanish	
Areas of Assessment	Single	Mixed	Single	Mixed
Productivity	3.83	3.87	4.23	4.17
Participation	4.67	4.13	4.29	3.89
Comfort Level	4.60	4.53	4.23	4.17
Social Skills	4.00	3.67	3.83	3.83

According to Table 2, both the single and mixed responses of the math classes, were relatively close. Both groups felt that the level of productivity in their groups was slightly above average. The amount of participation in the single gender groups was .54 higher than mixed gender. However, both would be described as having all group

members participating at some point in the activity. The comfort level in single gender groups was .07 higher than mixed gender. Both groups felt that they were able to express their ideas and opinions openly. Finally, social skills were more evident in single gender groups. Positive comments were heard .33 times more in single gender groups than in mixed gender groups.

The Spanish responses on their assessment forms showed more favorable responses from the single gender groups than from the mixed gender groups. In the categories of productivity, participation, and comfort level, single gender groups showed higher results. Under the social skills category, both single and mixed gender groups showed equal responses. This displays that they generally felt that there were no put downs given and that all group members' efforts were valued. The largest difference in the results is in the participation category. The single gender groups scored .40 higher than the mixed gender groups. This implies that occasionally either one group member did not help or everyone helped.

Overall, when comparing the math and Spanish classes, single gender groups' responses were slightly higher than mixed gender groups. Therefore, one may conclude that single gender grouping allows students to be more functional while working cooperatively. Productivity, participation, comfort level, and social skills increase when students work with members of the same gender.

Along with the factors mentioned above, student academic achievement also increases when students work cooperatively with members of the same sex. Figure 1, as presented in Chapter 2, showed that single gender was higher than mixed gender by approximately 1.00% in weeks one through four. However, Figure 2, as presented in Chapter 2, shows that mixed gender groups achieved higher than single gender. Figure 3 and Figure 4 display the average group activity scores for both single and mixed genders during weeks one through fifteen.

When comparing Figure 3 and Figure 4, single gender groups' academic achievement was higher than mixed gender groups. In 17 out of the 30 given activities, single gender groups' average scores were higher than mixed gender scores. However, there are 16 activities out of the 30 activities when the average scores differed by 5.00% or less. Figure 3 shows that single gender groups received higher average activity percentages 10 times out of the 15 activities. The following are the differences when mixed gender averages were higher:

week 2 - 4.63%

week 5 - 5.90%

week 12 - 15.30%

week 13 - 0.20%

In general, according to Figure 4, single gender groups scored higher than or almost equal to mixed gender groups. Single gender groups scored higher in 7 out of the 15 activities performed. During weeks 8, 9, and 10, mixed gender groups averaged slightly higher percentages than single gender. The following are the differences:

week 8 - 1.40%

week 9 - 1.20%

week 10 - 1.00%

Students' comments and observations may further explain these results. Such comments and observations were recorded by the participating teachers, throughout the cooperative activities, as they took place in their classrooms during the fifteen week period.

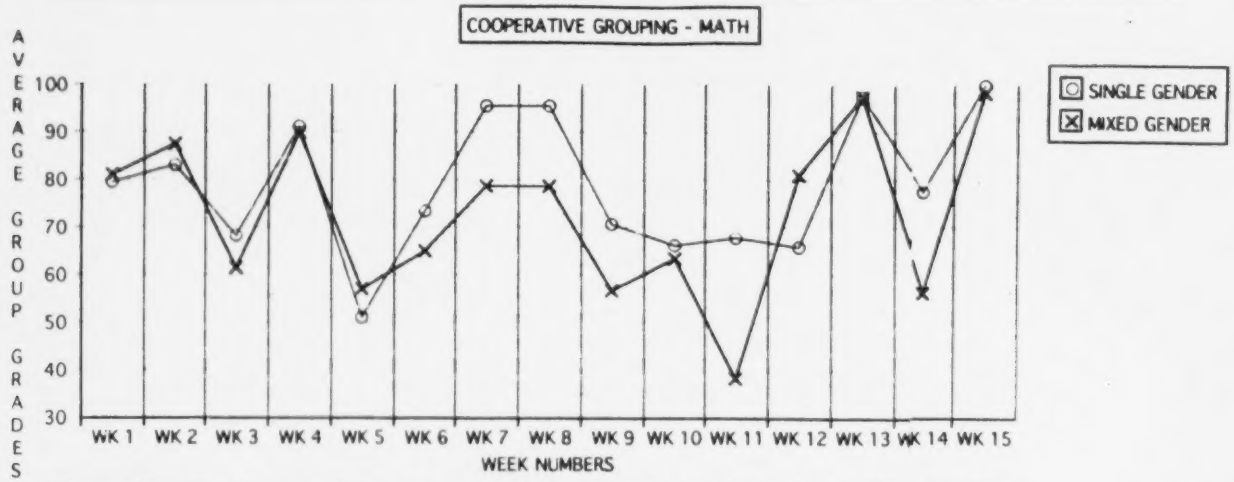

Figure 3. The figure above represents grades from students at Site A. The percentages were derived from cooperative activities during the 15 weeks of research.

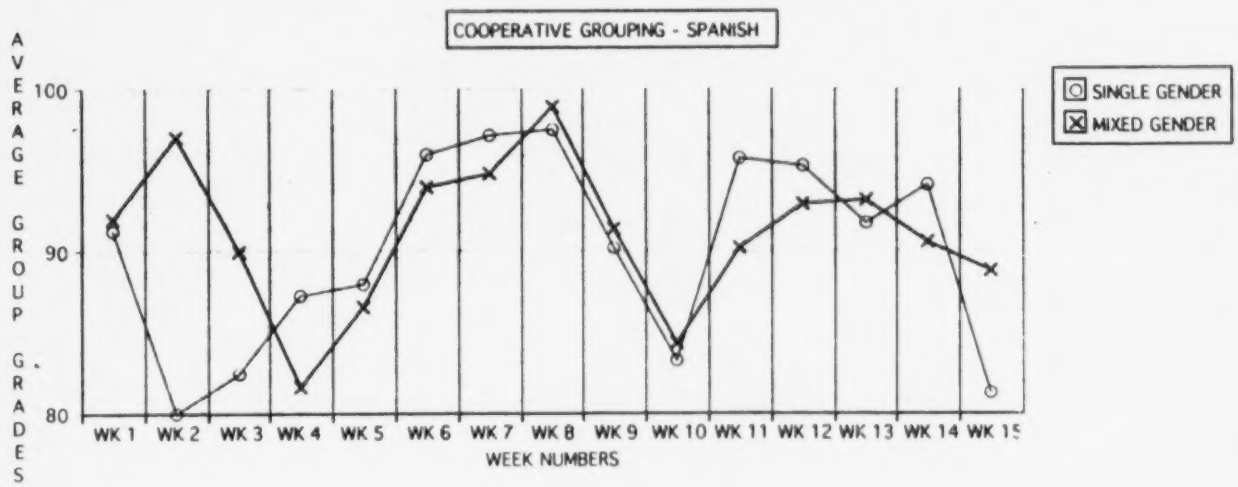
COOPERATIVE GROUPING - SPANISH
AVERAGE GROUP GRADES
100
90
80
WK 1 WK 2 WK 3 WK 4 WK 5 WK 6 WK 7 WK 8 WK 9 WK 10 WK 11 WK 12 WK 13 WK 14 WK 15
WEEK NUMBERS
SINGLE GENDER
MIXED GENDER

Figure 4. The figure above represents the average group grades for Site B during

weeks one through fifteen.

Student Comments

Throughout the activities, teachers heard comments from students in mixed groups such as:

1) A female group member asked a male, "Should I write it like that?"
2) A female said to a male, "You are probably right."
3) A female said to a male, "Just do what you want to do."
4) A male said to the teacher, "She is not doing anything."
5) A female replied to a male, "I don't get how to do it and you won't tell me!"

The following comments were noted from students in single gender groups, such as:

1) A female asked another female, "How did you get that?"
2) A male said to a male, "Good thinking."
3) A female, after shouting to a male in another single group, said to the teacher, "I just wanted to tell him that we got number three. I want to rub it in!"
4) A female confidently said to another female, "I have a good idea for our project."
5) A female group said to a male group, "We got it before you!"

Teachers observed the following student behaviors in mixed gender groups:

1) Students seem to work more independently and occasionally asked each other for help.
2) A boy turned away from his female partner to talk to two of his friends that were sitting near him.
3) Boys dictated answers while girls affirmed and recorded answers.
4) Girls asked each other questions first rather than asking boys in the group.
5) Individuals would ask the teachers questions before asking their group members.

The following student behaviors in single gender groups were observed by the teachers:

1) Boys groups chose to sit on the right side of the room. Girls chose to sit on the left side of the room. The space in between was empty.

2) Female single gender groups appeared to use more brainstorming techniques with each other.

3) Single gender groups socialized more than mixed gender, but still completed their task.

4) Single gender groups delegated work among group members immediately.

5) Single gender groups appeared to really get involved in the activity.

When analyzing these comments and behaviors, one may develop numerous conclusions.

Conclusions and Recommendations

As recorded in the graded student artifacts, student assessment forms, and teacher observation journals, single gender groups achieved higher scores, received more favorable evaluations, and were noted for more positive group interactions.

During the course of this project, the teachers witnessed many strengths. While working in cooperative groups, students increased their social skills and academic achievement as well as experienced the life skill of working and communicating with others. Participants became better acquainted with each other and experienced a wide variety of learning methods. They were able to receive additional help by using each other as resources. Students also learned to value and respect other's opinions. Along with this, they were exposed to the pluses and minuses of interdependence. Overall, the teachers observed during the cooperative activities that the participants' self-esteem increased, which in turn, encourages them to participate more actively in class.

Several weaknesses were also evident in this project. In the beginning, some students may have been unaware of the expectations associated with cooperative learning. For example, classes may not have experienced practice in social skills. Students occasionally abused the social aspect of group work. Student assessment forms may not have been completed truthfully due to the repetitive use of these sheets.

Teachers experienced numerous time restraints in data collection. Problems developed in covering curriculum and in implementing cooperative tasks in the allotted class period. Many students voiced their opinions about participating in too many structured activities in only a 15 week period of time.

It is recommended that cooperative learning be used, as an educational tool, since it helps students increase their academic achievement and social skills. Such increases are evident in Figure 1 through 4 as well as Tables 1 and 2. When implementing this tool in the classroom, it is imperative to introduce and practice social skills and individual accountability before scoring students' work. It is also recommended that longer lengths of time be used to conduct cooperative group activities. Students should be allowed to assess their group work by giving them varied evaluation forms rather than one standard form. This will encourage students to complete them diligently. It is also important to incorporate both single and mixed gender grouping in order to achieve success in student performance. The cooperative learning technique can be beneficial for students of any age.

A possible extension of this action research project is to create single gender classrooms within a heterogeneous school setting. An in depth study may then be conducted to analyze the effects of such an implementation as well as the benefits of single gender grouping on females versus males.

This study was limited in research. However, other areas of importance can also be studied as an extension of this action research project. For example, a case

study may be created to analyze how the practice of social skills can improve the effectiveness of mixed groups. One may also conduct research to discover whether situations and/or times exist when it would be beneficial to use one method of grouping over the other.

Single gender grouping increases student academic achievement, but both single and mixed gender groups are beneficial. When in homogeneous groups students enhance their academic skills as well as improve their social skills. They express themselves openly, are more creative, and become self-confident individuals. Students learn about each other and learn how to work with peers who have similar and different abilities, style, and opinions. Putting students in groups gives them the opportunity to practice and master a skill as well as provide feedback for themselves and their group members.

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APPENDIX A

STUDENT ASSESSMENT FORM

NAME_____
DATE _____

* Circle number that best describes your group.

	1	2	3	4	5
Productivity	Did NOT accomplish our task		We did OK, but there are things we could have done better.		We truly deserve an "A" !
Participation	At least 2 members did NOT help.		At least 1 person did NOT help.		Everyone helped accomplish our task!
Comfort Level	I felt uncomfortable giving my opinion or expressing my thoughts.		I shared some ideas, but not all the ones I was thinking.		I was able to express my ideas openly!
Social Skills	Members ideas or work was criticized/put down.		No "put downs" were said, but no positive comments were said.		Member's work was valued and acknowledged. That's a good idea!"

ADDITIONAL COMMENTS...